

GPT4Rec: A Generative Framework for Personalized Recommendation and User Interests Interpretation

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Abstract

Recent advancements in Natural Language Processing (NLP) have led to the development of NLP-based recommender systems that have shown superior performance. However, current models commonly treat items as mere IDs and adopt discriminative modeling, resulting in limitations of (1) fully leveraging the content information of items and the language modeling capabilities of NLP models; (2) interpreting user interests to improve relevance and diversity; and (3) adapting practical circumstances such as growing item inventories. To address these limitations, we present GPT4Rec, a novel and flexible generative framework inspired by search engines. It first generates hypothetical "search queries" given item titles in a user's history, and then retrieves items for recommendation by searching these queries. The framework overcomes previous limitations by learning both user and item embeddings in the language space. To well-capture user interests with different aspects and granularity for improving relevance and diversity, we propose a multi-query generation technique with beam search. The generated queries naturally serve as interpretable representations of user interests and can be searched to recommend cold-start items. With GPT-2 language model and BM25 search engine, our framework outperforms state-of-the-art methods by 75.7% and 22.2% in Recall@K on two public datasets. Experiments further revealed that multi-query generation with beam search improves both the diversity of retrieved items and the coverage of a user's multi-interests. The adaptiveness and interpretability of generated queries are discussed with qualitative case studies.